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EFFECTS OF CUING ACTOR VS CUING OBJECT ON WORD ORDER IN SENTENCE GENERATION.

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RESULTS OF AN EARLIER STUDY SUGGEST THAT SENTENCES BEGINNING WITH NOUNS OF HIGH RESPONSE STRENGTH ARE EASIER TO LEARN THAN SENTENCES ENDING WITH NOUNS OF HIGH RESPONSE STRENGTH. THE INFERENCE DERIVED FROM THAT STUDY, AND TESTED IN THE PRESENT STUDY, WAS THAT THE ORDER OF A WORD IN NATURAL SPEECH IS A FUNCTION OF RESPONSE STRENGTH, SO THAT WORDS HAVING HIGH RESPONSE STRENGTH TEND TO BE EMITTED EARLY. IT WAS ASSUMED FOR THIS STUDY THAT THE NAMING RESPONSE TO A STIMULUS ITEM IS STRONGER IN THE PRESENCE OF THE STIMULUS THAN IN ITS ABSENCE. WHEN A PERSON'S MEMORY IS JOGGED BY A GIVEN REFERENT WHICH IS AN ELEMENT IN THE SITUATION TO BE DESCRIBED, HIS ACCOUNT OF THAT SITUATION IS MORE LIKELY TO HAVE THAT REFERENT NEAR THE BEGINNING THAN WHEN HE IS CUED BY A DIFFERENT REFERENT FOR THE SAME SITUATION. TWENTY UNDERGRADUATE STUDENTS LEARNED A 12-ITEM PAIRED ASSOCIATE TASK CONSISTING OF EITHER ACTOR OR OBJECT CUE SLIDES PAIRED WITH COLORED CARTOON RESPONSE SLIDES. THE SUBJECTS GENERATED THEIR OWN SENTENCES TO CORRESPOND TO THE RESPONSE SLIDES. WORD ORDER AND GRAMMATICAL CONSTRUCTION VARIED AS A FUNCTION OF CUE, WHERE THE CUE ELEMENT TENDED TO BE SAID EARLY IN THE DESCRIPTION OF AN EVENT. THIS REPORT APPEARED IN "STUDIES IN LANGUAGE AND LANGUAGE BEHAVIOR, PROGRESS REPORT IV," 1967, CENTER FOR RESEARCH ON LANGUAGE AND LANGUAGE BEHAVIOR, UNIVERSITY OF MICHIGAN, 220 EAST HURON STREET, ANN ARBOR, MICHIGAN 48108. (AUTHOR/JD)

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Effects of Cuing Actor vs Cuing Object on Word Order in Sentence Generation[1]

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Twenty Ss learned a 12-item paired-associate task consisting of either actor or object cue-slides paired with colored-cartoon response slides. The Ss generated their own sentences to correspond to the response slides. Word order and grammatical construction varied as a function of cue, where the cue element tended to be said early in the description of an event.

Sentences beginning with nouns of high response strength are easier to learn than sentences ending with nouns of high response strength (Prentice, in press). The inference derived from that study, and to be tested in the present study, was that the order of a word in natural speech is a function of response strength, so that words having high response strength tend to be emitted early. In the earlier study, normative word associates were used to manipulate the strength of specified verbal responses. In the present study, the naming response to a stimulus item is assumed to be stronger in the presence of the stimulus than in its absence. When a person's memory is jogged by a given referent which is an element in the situation to be described, his account of that situation is more likely to have that referent near the beginning than when he is cued by a different referent for the same situation.

Method

Materials. Two sets of 12 35-mm colored-cartoon slides were termed Materials 1 (M1) and Materials 2 (M2). M1 slides depicted the following: woman kicking girl, girl kicking woman, fireman kicking cat, cat chasing fireman, boy kicking dog, dog chasing boy, man dropping scarecrow, scarecrow kicking man, old man raking leaves, leaves covering old man, clown kicking ball, and ball hitting clown. M2 slides depicted: man dropping boy, boy kicking man, tramp kicking dog, dog chasing tramp, little boy catching frog, frog following little boy, old lady shooting ghost, ghost scaring old lady, soldier starting fire, fire burning soldier, girl kicking flower pot, and flower pot hitting girl. A cue-slide showing a pencil sketch of the actor and another cue-slide of the object were prepared for each colored-cartoon slide.

Procedure. Twenty paid volunteer undergraduates were randomly assigned to conditions and materials in order of appearance in the laboratory. There were two conditions, cued actor (A) and cued object (O), making four groups of five Ss: A-M1; A-M2; O-M1; O-M2.

A paired-associate task was used in which S was to learn to anticipate the colored-cartoon slide in response to the cue-slide before the response-slide appeared. The stimuli for A-M1 and A-M2 Ss were cue-slides showing the actor of the next response-slide. The stimuli for O-M1 and O-M2 Ss were cue-slides showing the object of the next response-slide. Twelve cue-response pairs constituted a trial. Slides were shown at a 5-sec rate on a Kodak Carousel projector. Materials were arranged in three different random orders, and starting points were randomized. Each S was run for 10 trials following a study trial. The S was instructed to say enough about the slide coming up that the E would know whether or not he had the correct slide in mind. Responses were recorded in abbreviated form by hand. A response was scored correct if it was an unambiguous description of the next slide, and if both referents (designated by E as actor and object) were included in the description.

Results and Discussion

The number of correct responses using actor-object word-order, and the number of correct responses using object-actor word-order, were tallied for each S. The mean number of correct responses in either word-order category for four conditions are listed in Table 1. The dependent variable was the number of correct antici-

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Insert Table 1 about here

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pations using actor-object word-order, minus correct anticipations using object-actor word-order. The difference score was reliably larger for Ss cued by the actor than for Ss cued by the object, F (1, 16) = 32.47, $p < .01$, indicating that Ss cued by the actor were significantly more likely to use actor-object word-order over object-actor word-order ($\bar{X}$ difference = + 93.2 sentences) than were Ss cued by the object. In fact, Ss cued by the object generated fewer sentences using actor-object word-order than object-actor word-order ($\bar{X}$ difference = - 11.2 sentences). Materials were not a significant variable in this study ($F < 1$), and the interaction between cue and materials was not significant ($F < 1$). It appears that a cue function increases the probability that the cue element will

have an early position in the word-order of the event described. This may be taken as evidence that word-order in natural speech is determined in part by the relative response strengths of the various lexical units which will make up a communication.

The grammatical constructions used most frequently to describe the slides were active sentences, which have actor-object word-order, and passive sentences, which have object-actor word-order. The mean number of actives generated in each condition were: A-M1 = 92.6; A-M2 = 74.4; O-M1 = 34.8; O-M2 = 43.4. Reliably more actives were generated under cued actor than cued object conditions, $\underline{F}$ (1, 16) = 16.81, $\underline{p} < .01$. Neither materials nor the cue x materials interaction was significant. Only one $\underline{S}$ in the A-M1 condition generated (4) passives, and only one $\underline{S}$ in the A-M2 condition generated (2) passives. The mean number of passives generated in O-M1 and O-M2 were, respectively, 45.4 and 35.8. The difference in the number of passives generated by two conditions of cuing was significant, Mann-Whitney $\underline{U} = 6$, $\underline{p} < .01$. Results based on a tally of active and passive sentence constructions correspond to results derived from the more general response categories of word-order.

Because animacy of actor and object has been of interest (Clark, 1965; Johnson, in press; Prentice, Barritt, & Semmel, 1966), the number of passives elicited in the cued-object conditions by various categories of actor-object animacy were tallied. It is to be expected that, as animacy of the object (traditional passive-voice subject) increases relative to the actor, the number of passives will increase. In slides in which the receiver of the action was human, the mean number of passives per slide per $\underline{S}$ is given in parentheses after the actor, which is the last word in the passive sentence: human (2.32); animal* (1.97); animated (1.80); inanimate** (1.47). This trend is opposite expectation. In slides in which the actor was human, the mean number of passives per slide per $\underline{S}$ is given in parentheses after the receiver of the action, which is the first-named item in the passive construction: human (2.32); animal (1.85); animated (1.35); inanimate (.92). This trend corresponds to expectation. A few slides (notably, frog following little boy*; leaves covering old man**, fire burning soldier**) were rarely described by either the active or the passive construction, so results should be interpreted with extreme caution.

Chomsky (1965, p. 221) notes the significance of word order in determining grammatical relations in surface structures, but discounts the role of word

order in the determination of grammatical relations in deep structure. In current theory, active and passive sentences differ in deep structure. Cuing, as defined in the present study, results in reliable changes in word order and accompanying changes in grammatical structure. Does the S sometimes name the cue element before he "knows" which slide he will describe? If this does, in fact, occur, word order plays a role in determining the grammatical relations of deep structure. Cuing brings about probabilistic changes in word order, which in turn effects a change in the underlying grammatical structure. Alternatively, cuing may effect a change in the semantic interpretation of the event to be described. According to current linguistic theory, semantic meaning resides in the base P-marker. The order of events brought about by cuing might be a change in semantic meaning, then deep structure, then word order. It seems necessary that cuing brings about a shift in emphasis. Whether the shift occurs at a verbal level, in tendency to name, or at a perceptual level, in interpretation of the event, is the question at hand. Noting differences in semantic interpretations owing to shifts in emphasis, where there is wide latitude in possible interpretations, could be revealing. One slide used in the present study, intended to depict a fire burning a soldier, turned out to be ambiguous. The Ss in both M2 cue-conditions described the identical colored-cartoon slide. The descriptions offered by fire-cued Ss on Trial 5 were: fire burning sleeve, man destroying fire, fire burning man's hand, fire starting up before soldier, and fire burning soldier's hand. Soldier-cued Ss described the coming slide as: soldier putting out fire, he's [soldier] again having trouble with his fire, soldier burned by fire (2 Ss), and soldier dropping wood on fire. There appears to be a shift in the Ss' interpretations of the slide as a function of cue, in which the cue element is ascribed greater potency in the event described. This post hoc observation suggests that a study needs to be made of the relationships among changes in perceptual set, semantic interpretation, and grammatical construction.

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Footnote

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Table 1

Mean Number of Sentences Generated with Actor-Object and with Object-Actor Word Order for Two Sets of Materials following a Cue for either Actor or Object

	Actor-object word order		Object-actor word order	
	Materials 1	Materials 2	Materials 1	Materials 2
Cued actor	99.80	98.60	6.80	5.20
Cued object	38.20	47.40	60.20	48.00